

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Jouni HYVÄRINEN et al.

Attn: PCT Branch

Application No. New U.S. National Stage of PCT/FI03/00637

Filed: February 18, 2005

Docket No.: 122835

For: METHOD AND APPARATUS FOR PROCESSING A PREFORM

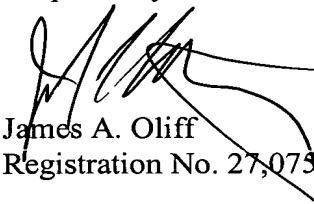
**SUBMISSION OF THE ANNEXES TO THE
INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto is a submission of the annexes to the International Preliminary
Examination Report (Form PCT/IPEA/409). The attached material replaces all the claims.

Respectfully submitted,



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Claims

1. A device for processing/stretching a preform (2), the device comprising at least two gripping means (4, 6) for securing the preform (2) to the processing device, at least one heating device (12) for heating the preform or a section thereof to a desired temperature, the gripping means (4, 6) and the heating device (12) being arranged movable **characterized** in that the gripping means (4, 6) and the heating device (12) are arranged optionally movable so that they allow the end product produced to be held in position during the processing process relative to the body of the processing device, irrespective of the direction of the processing/stretching, by holding the gripping means on the side of the end product of the preform in position relative to the body of the processing device.

2. A device as claimed in claim 1, **characterized** in that the gripping means (4, 6) and the heating device (12) are arranged such that the speed of movement and direction of movement of each of them are separately adjustable.

3. A device as claimed in claim 1 or 2, **characterized** in that it comprises means (14, 16) for rotating the preform (2) around its longitudinal axis during the processing.

4. A device as claimed in any one of claims 1 to 3, **characterized** in that it further comprises one or more independently movable cutting device for cutting the preform and/or a fibre.

5. A method of processing/stretching a preform (2) comprising the steps of:

securing the preform (2) to a processing device by means of at least two separate independently movable gripping means (4, 6);

heating the preform (2) or a section thereof by means of at least one independently movable heating device (12) at least locally; and

generating a tension in the preform (2) by moving at least one of the gripping means (4, 6);

characterized in that the method further comprises step of:

processing the preform (2) by feeding it to the heating device (12) by moving one of the gripping means (4, 6) and the heating means (12) and by holding the gripping means (4, 6) on the side of the end product of the preform in position relative to the body of the processing device whereby the end prod-

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uct produced also remains in position relative to the body of the processing device, irrespective of the direction of the processing/stretching.

6. A method as claimed in any one of claims 5, **characterized** in that the speed of movement and the direction of movement of each gripping means (4, 6) and heating device (12) are separately adjustable.

7. A method as claimed in any one of claims 5 to 6, **characterized** by performing the processing/stretching of the preform vertically from the top downwards.

8. A method as claimed in any one of claims 5 to 6, **characterized** by performing the processing/stretching of the preform vertically from the bottom upwards.

9. A method as claimed in any one of claims 5 to 8, **characterized** by rotating the preform (2) around its longitudinal axis during the processing.

10. A method as claimed in any one of claims 5 to 9, **characterized** by using two or more heating devices (12) in the processing of the preform.

11. A method as claimed in claim 10, **characterized** by adjusting the speed and direction of movement of each heating device (12) separately.

12. A method as claimed in any one of claims 5 to 11, **characterized** by using the method for correcting variations in the diameter of the preform.

13. A method as claimed in any one of claims 5 to 11, **characterized** by using the method for correcting the roundness of the preform.

14. A method as claimed in any one of claims 5 to 11, **characterized** by utilizing the method in association with a sleeving process.

15. A method as claimed in any one of claims 5 to 11, **characterized** by utilizing the method in association with a collapsing process.

16. A device for drawing an optical fibre from a preform, the device comprising at least two gripping means, of which at least one is provided with coiling means for the optical fibre, for securing the preform to the drawer, and at least one heating device for heating the preform or a section thereof to a desired temperature, the gripping means and the heating device being arranged movable **characterized** in that that gripping means and the heating device are arranged optionally movable such that irrespective of the

selected drawing direction, the heating device and one of the gripping means are movable relative to the body of the drawer and to the other gripping means, which is immovable relative to the body of the drawer and to which a coiling device is connected for coiling the end product/optical fibre to a coil, whereby both a heating device and the gripping means that is movable relative to the body of the drawer move relative to the coiling device that receives the end product/optical fibre.

17. A device as claimed in claim 16, **characterized** in that the gripping means and the heating devices are arranged such that the speed of movement and the direction of movement of each of them are separately adjustable.

18. A device as claimed in claim 16 or 17, **characterized** in that it comprises devices for rotating the preform around its longitudinal axis during the processing.

19. A device as claimed in any one of claims 16 to 18, **characterized** in that coiling means are arranged in each of the gripping means.

20. A device as claimed in any one of claims 16 to 19, **characterized** in that it also comprises one or more independently movable cutting device for cutting the preform and/or the fibre.

21. A method of drawing an optical fibre from a preform comprising the steps of:

securing the preform to a drawer by means of at least two separate independently movable gripping means;

heating the preform or a section thereof by means of at least one independently movable heating device at least locally;

generating a tension in the preform by moving at least one of the gripping means;

characterized in that the method further comprises steps of:

drawing optical fibre from the preform by moving one of the gripping means and the heating device and by holding the gripping means on the side of the produced optical fibre in position relative to the body of the drawer; and

coiling the produced optical fibre with a coiling device arranged in the gripping means that is immobile relative to the body of the drawer onto a coil, whereby both a furnace and the gripping means that is movable relative to

the body of the drawer move relative to the coiling device that receives the end product/optical fibre irrespective of the selected drawing direction.

22. A method as claimed in any one of claims 21, **characterized** in that the speed of movement and the direction of movement of each gripping means and heating device are separately adjustable.

23. A method as claimed in any one of claims 21 to 22, **characterized** by performing the drawing of the optical fibre vertically from the top downwards.

24. A method as claimed in any one of claims 21 to 22, **characterized** by performing the drawing of the optical fibre vertically from the bottom upwards.

25. A method as claimed in any one of claims 21 to 24, **characterized** by rotating the preform around its longitudinal axis during the drawings.

26. A method as claimed in any one of claims 21 to 25, **characterized** by using two or more heating devices in the drawing.

27. A method as claimed in claim 26, **characterized** by adjusting the speed and direction of movement of each heating device separately.

28. A method as claimed in any one of claims 21 to 27, **characterized** by using the method in shaping a tubular preform for both adjusting the diameter and adjusting the wall thickness.

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